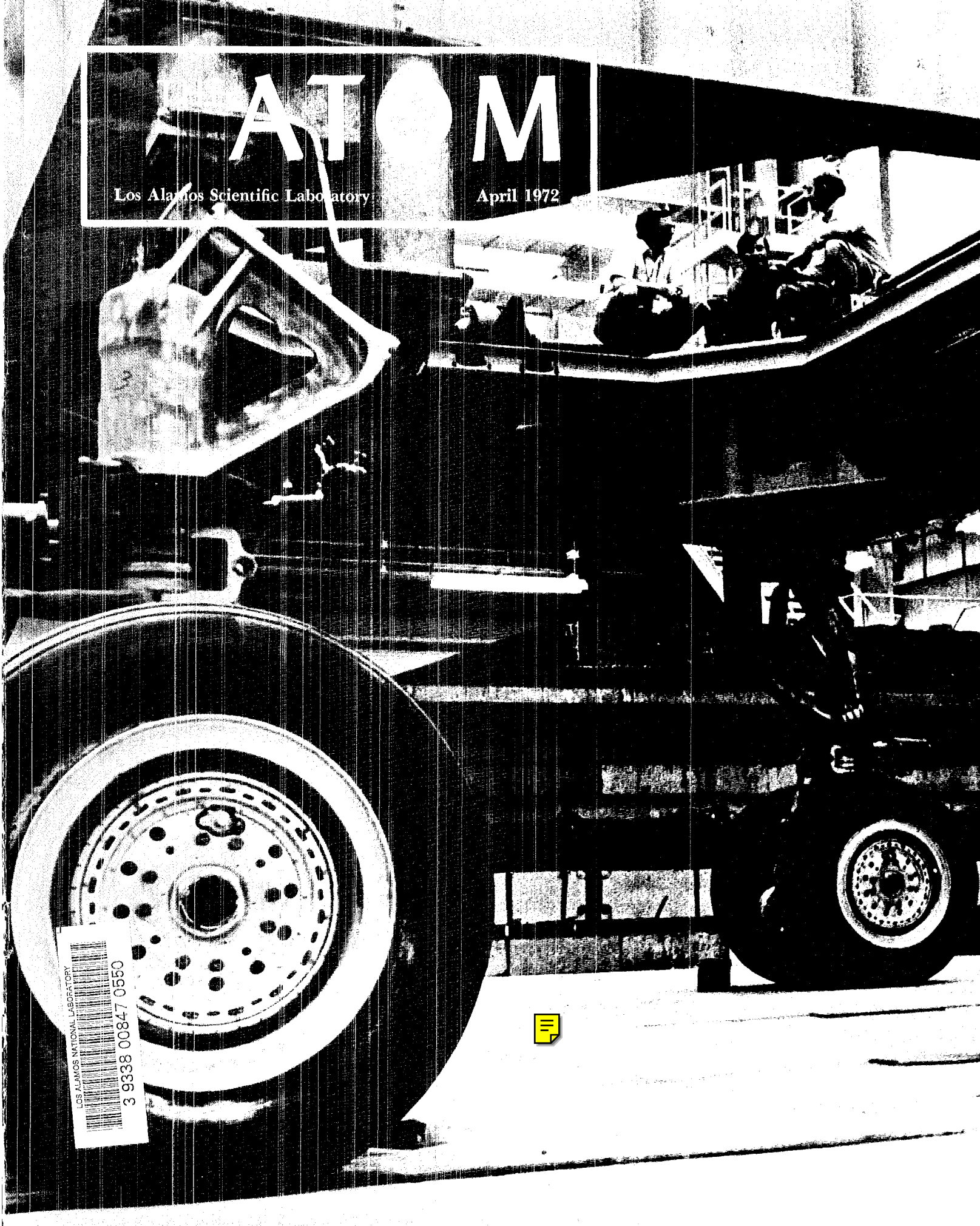

ATOM

Los Alamos Scientific Laboratory

April 1972

Volume 9 Number 3
April 1972

THE ATOM

Published monthly except for July-August and January-February issues by the University of California, Los Alamos Scientific Laboratory, Office of Public Information, P. O. Box 1663, Los Alamos, New Mexico 87544. Second Class Postage Paid at Los Alamos.

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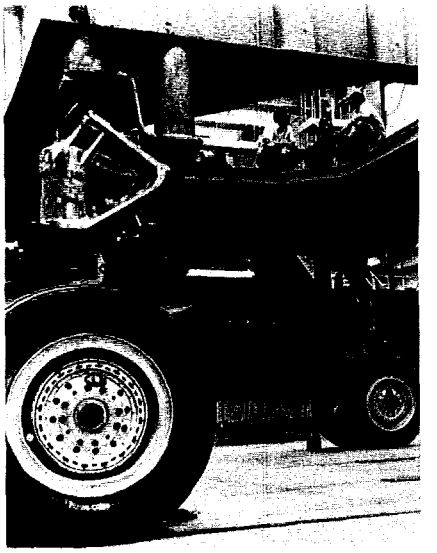

COVER:

The cover photograph is of the self-propelled gantry that will be mated to a hot cell for maintenance of the Los Alamos Meson Physics Facility accelerator's auxiliary components in highly radioactive areas. Together, the gantry and hot cell make up a vehicle which has been named the "Merrimac" after the Civil War ironclad vessel. For more detailed information see the story beginning on page one.

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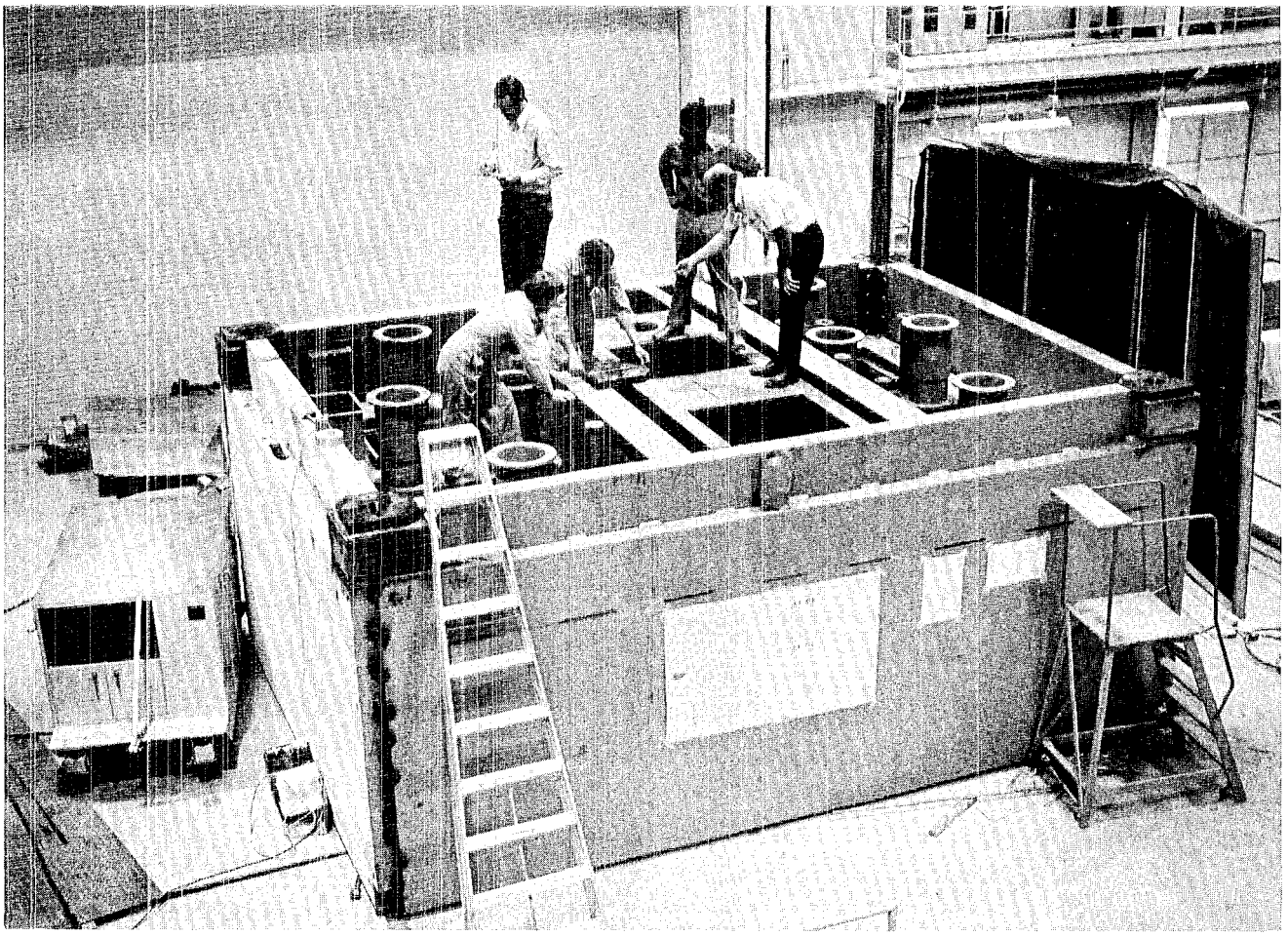
Photography: Bill Jack Rodgers and Ivan Worthington

Office: D-403A Administration Building. Telephone: 667-6102. Printed by the University of New Mexico Printing Plant, Albuquerque.



Bob Gardella, ENG-6, right, supervises work on the transfer port and tubes in the top of the "Merrimac" box. Other members of the work party are Bill Duran, MP-6, Dick Shaw, ENG-3, and Bennie Trujillo and Dick Martinez, both of MP-6.

Shades of the Civil War

The 'Merrimac' is Back

At the beginning of the Civil War, Union forces scuttled the steam frigate "Merrimac" before abandoning the Norfolk Navy Yard at Portsmouth, Va. She was subsequently raised by the Confederates and converted into a formidable ironclad which engaged the Union's "Monitor" in combat, the first combat between ironclads, marking a revolution in naval warfare.

In May of 1862, the "Merrimac" was destroyed when the Union army's advance forced the Confederates to abandon the Norfolk Navy Yard. The "Merrimac" has been gone for 110 years now, but another ironclad vessel has been given her name.

This is a portable hot cell which is being built at the Los Alamos Scientific Laboratory. It was conceived by Mahlon Wilson, MP-6 associate group leader, to provide remote maintenance service in highly radioactive areas at the Los Alamos Meson Physics Facility (LAMPF).

The LAMPF accelerator will produce an 800-MeV proton beam. While traversing a switchyard, the beam can be directed into any combination of three experimental areas. Experimental Area A, and the biomedical facility and beam stop beyond, are straight line continuations of the accelerator beam path. Here the beam will interact with several targets as it travels within a 40-foot-wide wall of shielding, rising 23 feet off the Experimental Area A floor.

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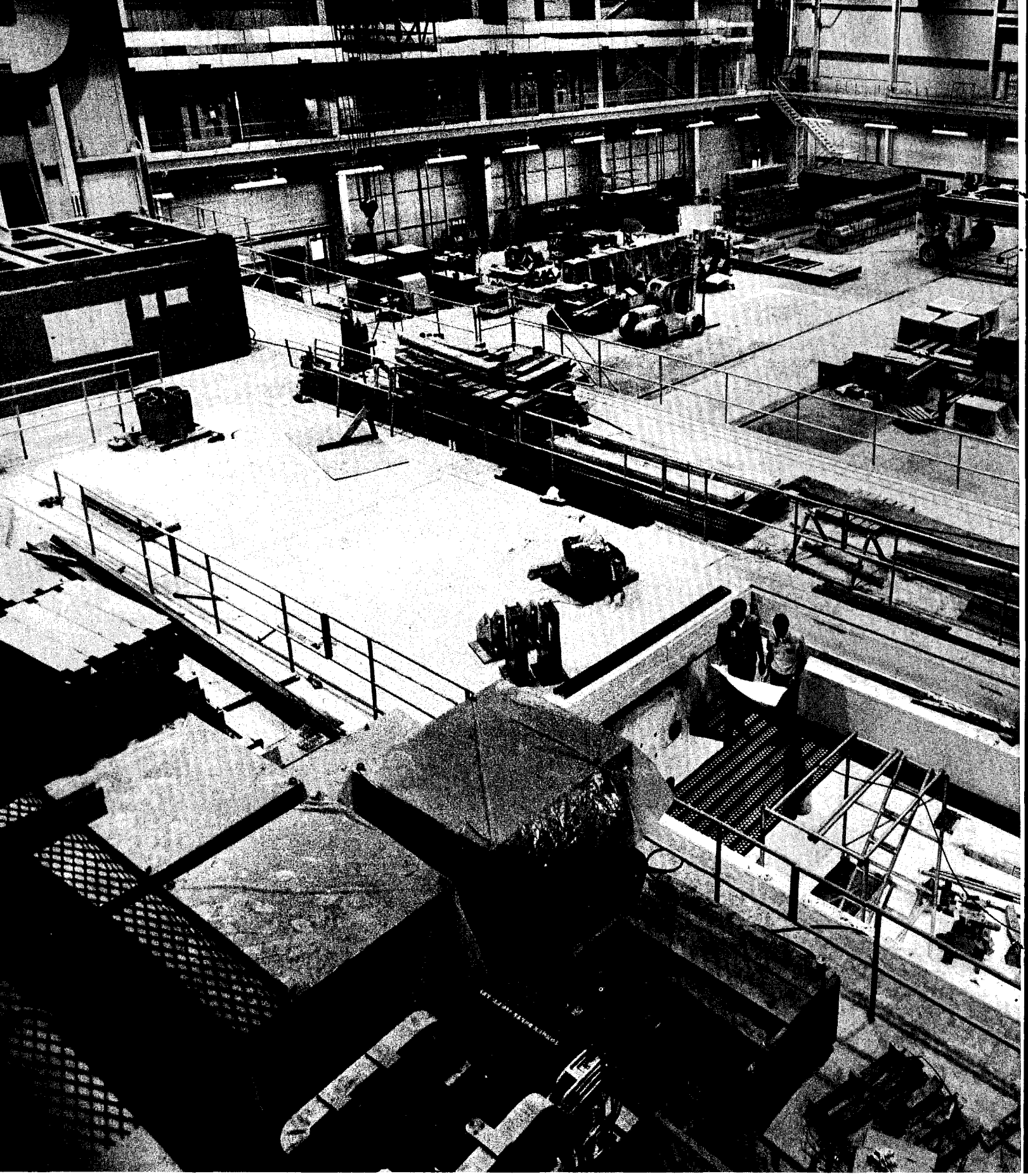

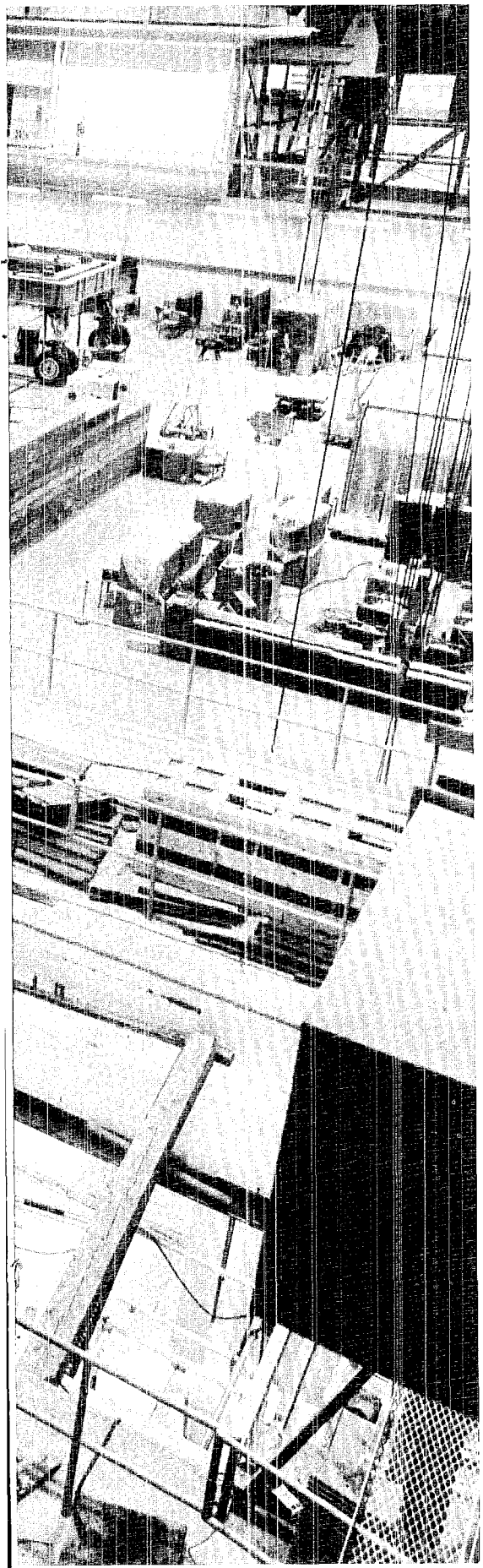

Eric Foster, ENG-6, and Mahlon Wilson, associate MP-6 group leader, study engineering drawings of Experimental Area A facilities being built to complement "Merrimac" operations. The opening in the floor, lower right, is the grease pit over which the ironclad vehicle will be located when not in use. The steel doors, left of the pit, will provide the "Merrimac" with access to two hot cells. The vehicle will drive along the top of a wall of shielding that will extend from the position of the box, left, to the open door above the gantry, upper right. Next to the gantry is a prototype of half of one of the huge, sliding double-doors that will provide access to beam-line components beneath the top surface of the wall.

The "Merrimac," a 200-ton shielded box mounted beneath a self-propelled gantry, is designed to drive along the top of this wall and to service beam-line components through openings that will normally be covered by huge, steel, sliding double-doors. Ten of these doors are planned, each of which will be 14-feet thick and 13- to 18-feet wide.

The gantry is positioned astride one of these double-door systems. The doors part at the center, leaving an opening large enough for the "Merrimac" box. The box is lowered from the gantry into the opening to the ledge upon which the doors rolled. At this point the top of the box is nearly flush with the top surface of the wall and serves as a shield plug.

The gantry may then be driven away and a power-supply cart attached to the box to provide power for lights, manipulator equipment and radiation and television monitors. Through lead-glass windows embedded in the roof of the box or portable hot cell, personnel can inspect components and observe operations of the hoist and manipulator housed inside the box.

If a beam-line component cannot be serviced by the portable equipment, it is hoisted into the box which is then picked up by the gantry and carried to either of two hot cells. The "Merrimac" gains access to the hot cells in much the same manner as it does the shielded wall. The gantry straddles a steel door which is rolled open. The portable hot cell is lowered onto the ledge, which supported the weight of the door, and serves as a shield plug. Its hoist lowers the component into the hot cell below.

When not in use the "Merrimac" will be situated over a "grease pit" adjacent to the hot cells where it can be serviced or its manipulator equipment and hoist used for other purposes.

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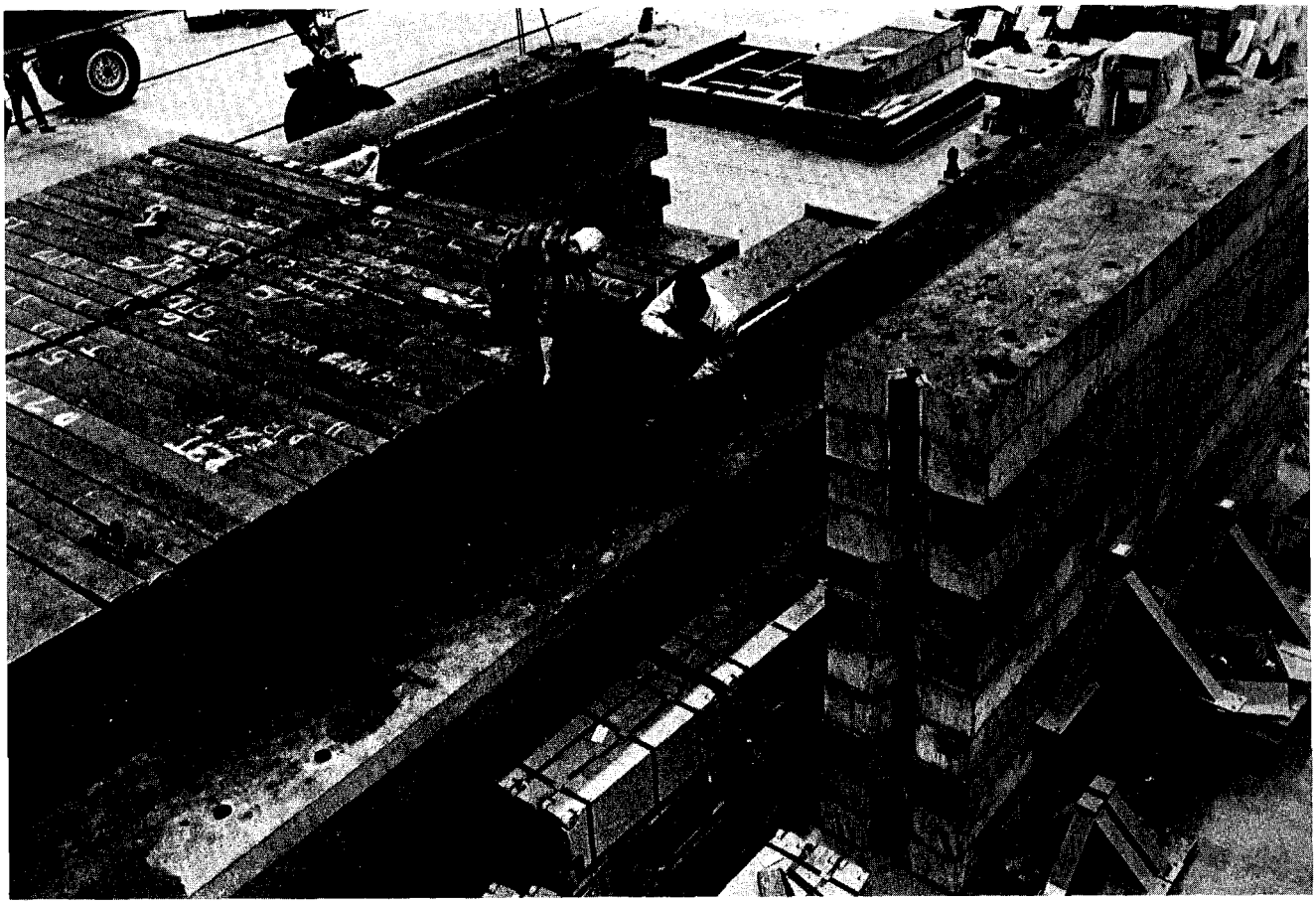
Inspecting one of the modified B-52 bomber landing-gear assemblies are Foster, Harold Robinson, ENG-7, and Ray Miller, ENG-6.



Joe Uher, MP-6, and John Allen, ENG-7, discuss the hydraulic system being tested on the prototype door. Ten 14-foot-thick, steel double-doors are planned to provide the "Merrimac" access to beam-line components. The largest of these doors is expected to approach 200-tons.

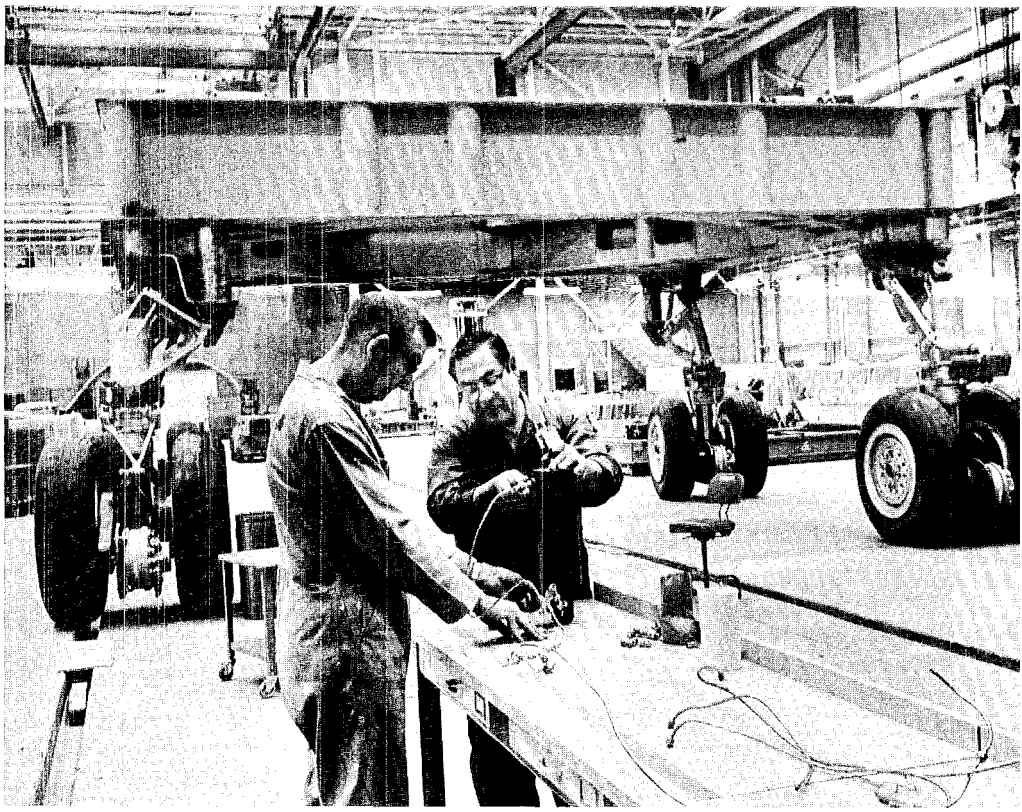
The "Merrimac" portable hot cell is a 13′ x 18′ x 8′ box with 18-inch-thick laminated steel walls. Each of the walls is painted a different color—red, white, blue and yellow—not for aesthetics but for orientation. Remote controls are coded with matching colors so that manipulator equipment will be given direction corresponding to color. The roof of the box consists of layers of steel, lead and ferrophosphorus aggregate. Embedded in it are four lead-glass windows, a series of tubes through which cables from overhead cranes can be lowered when the weight of a component exceeds the capabilities of the "Merrimac's" hoist, and a transfer port through which tools can be lowered for use by the manipulator equipment.

At each of its corners, the box is linked to the gantry by an eight-foot, 100-ton-rated ball screw, used to raise and lower the portable hot cell.

The gantry consists of four rubber-tired wheel assemblies mounted on a rectangle of steel beams. The wheel assemblies are landing gear taken from surplus B-52 bombers. They have been modified so each assembly will turn a full 360 degrees.

The wheels are driven at speeds up to one mile an hour by hydraulic power originating from a 100-horsepower diesel engine mounted on the gantry. The diesel engine is also linked to hydraulic circuitry for raising and lowering the portable hot cell and for opening and closing the doors on the top surface of the shielded wall and above the hot cells.

The maintenance vehicle is as unique a tool to scientists as it is to the layman. Standard practice is to build a system of "caves," complete with manipulators, tooling and television monitors for observing manipulator operations, adjacent to the beam-line components. "These caves require large amounts of shielding." Wilson said, "and shielding is expensive. By using the 'Merrimac' we've saved between $1 million and $2 million in shielding and handling equipment costs. With the exception of the hoist and manipulators most of the other materials used in the 'Merrimac' were taken from surplus lists so we've saved some money there too."



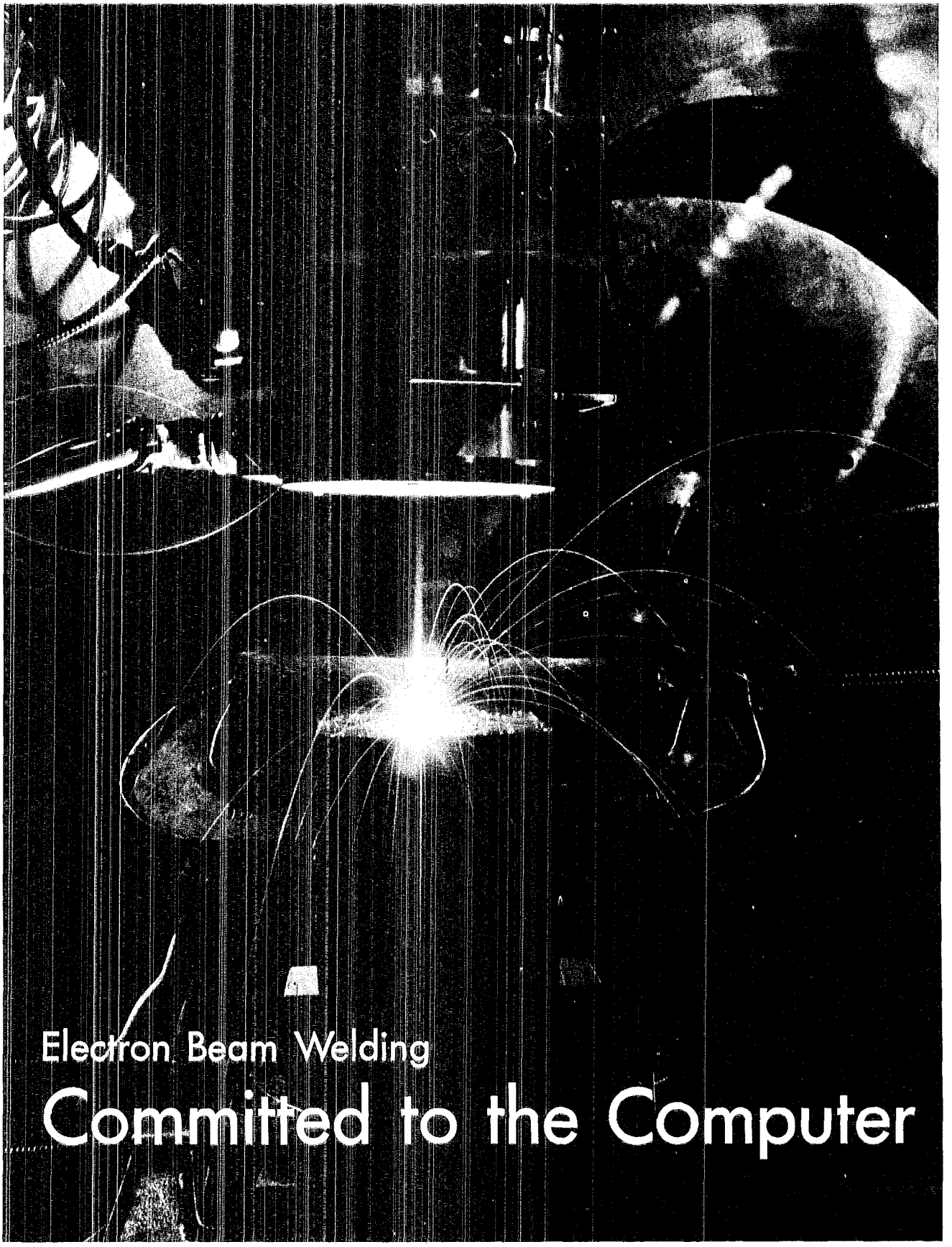
Charles Brown and Al Tafoya, both of MP-6, put together a hydraulic steering cylinder that will be used on the "Merrimac" gantry wheel-assemblies.

The "Merrimac's" box and gantry will be mated and tested sometime this month. Because the shielded wall has not yet been built, the tests will be conducted over the hot cells and grease pit. "If the 'Merrimac' will work above the hot cells, we know it will work on the wall," Wilson said.

The MP-6 associate group leader noted that the "Merrimac" and associated systems concepts were designed with help from several members of LASL's Engineering department. Key figures include Eric Foster, Robert Gardella and Raymond Miller, all of ENG-6, John Allen and Harold Robinson, both of ENG-7, and Jim West of ENG-3. Linus Thorn, MP-6, contributed to the original concept and Jan Novak, MP-7, performed gantry stress analyses.

"Experimental Area A was designed with the 'Merrimac' in mind," Wilson said. "If a component fails in the primary beam line it means the whole line has to be shut down until it's fixed. The time required for it to cool down to the point where men can safely repair or replace the component is too costly in terms of both research time and money. Although the 'Merrimac' gives us a rapid maintenance capability, we hope we never have to use it. If we do a good job in designing beam-line components, its use should be minimal."

Wilson threads a safety plate onto one of four 100-ton-rated ball screws that will be used to mate box and gantry. The box will be raised and lowered by the ball screws, one of which will be mounted at each corner. The safety plates will bear the weight of the portable hot cell should a ball screw fail.



Electron Beam Welding

Committed to the Computer

Electron beam welding isn't exactly a household name, although it has been around for more than a decade. It's a specialized welding process that grew up with the jet aircraft industry and is now spreading over a wide spectrum of large industrial applications.

Through the years, electron beam welding machines have been adapted to numerical control units which provide a degree of automation. With this system, commands are transmitted by way of a punched tape to make straight-line welds and, with limitations, circular and contour welds.

Now electron beam welding machines are being married to minicomputers which provide greater flexibility in welding along complex paths. The first of this new generation of electron beam welding machines to become operational recently completed acceptance testing by the Los Alamos Scientific Laboratory's Group CMB-6 Fabrication section.

Basically, a small computer has been linked to a standard electron beam welding machine which consists of an electron gun housed in a 68″ x 68″ x 78″ vacuum chamber. The electron gun bombards the metal parts to be joined with high-energy electrons which are concentrated into a small spot-focus beam. When the beam strikes the parts to be welded, kinetic energy of the electrons is converted to heat which melts and fuses the parts together. The inert atmosphere within the vacuum chamber prevents slag from forming in the weld and enhances welding speed since there is a minimum heat loss in a vacuum. The welded parts also cool slower in a vacuum so there is no shrink-cracking or cratering in the weld.

When complex paths are to be tracked by the electron gun, they are first to be found on engineering drawings. These are translated into numerical values the computer understands. With a small keyboard an operator can transmit a set of instructions or modify instructions. The machine is also equipped with a manual control console for use in determining weld parameters for the computerized system, when parameters exceed the limitations of the computer, and for simple jobs that can be done easily without the aid of the computer.

According to Gale Hanks, section leader, "Setup time on the new

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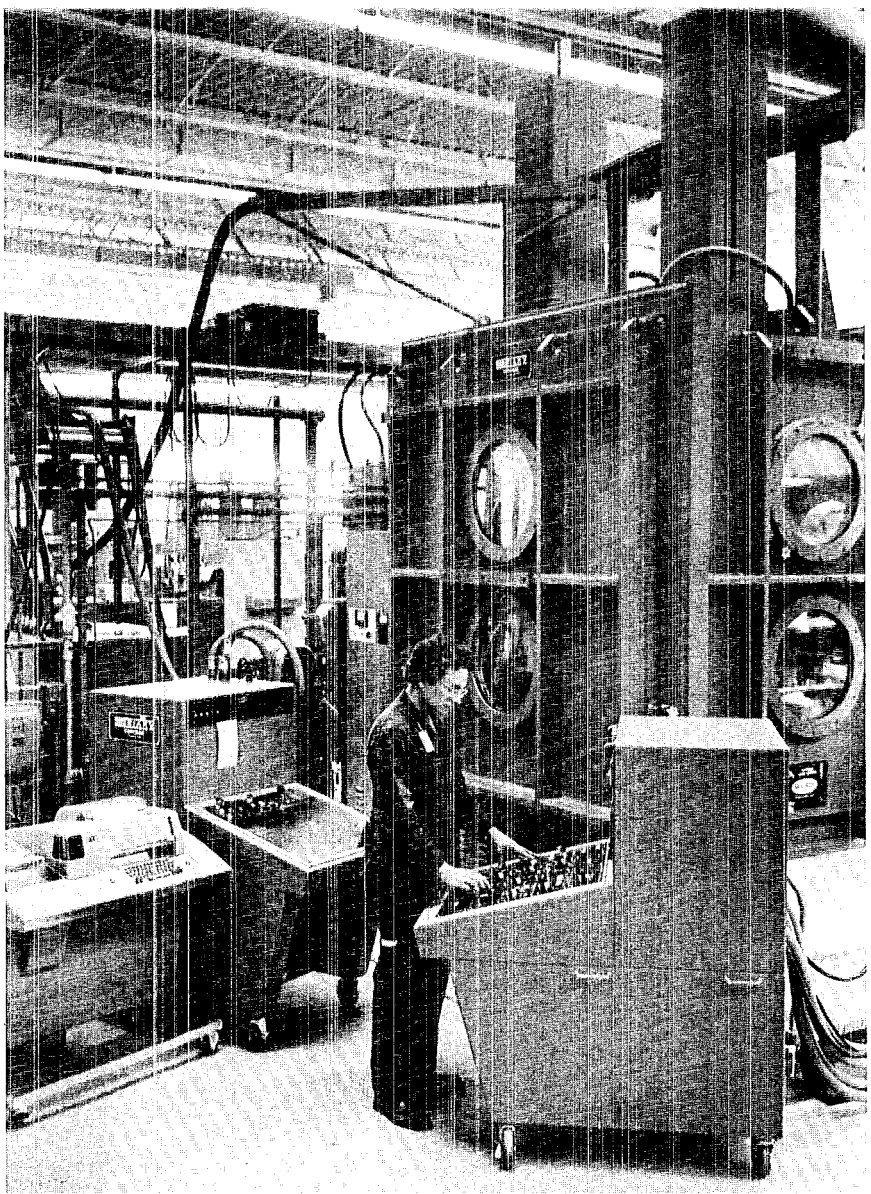
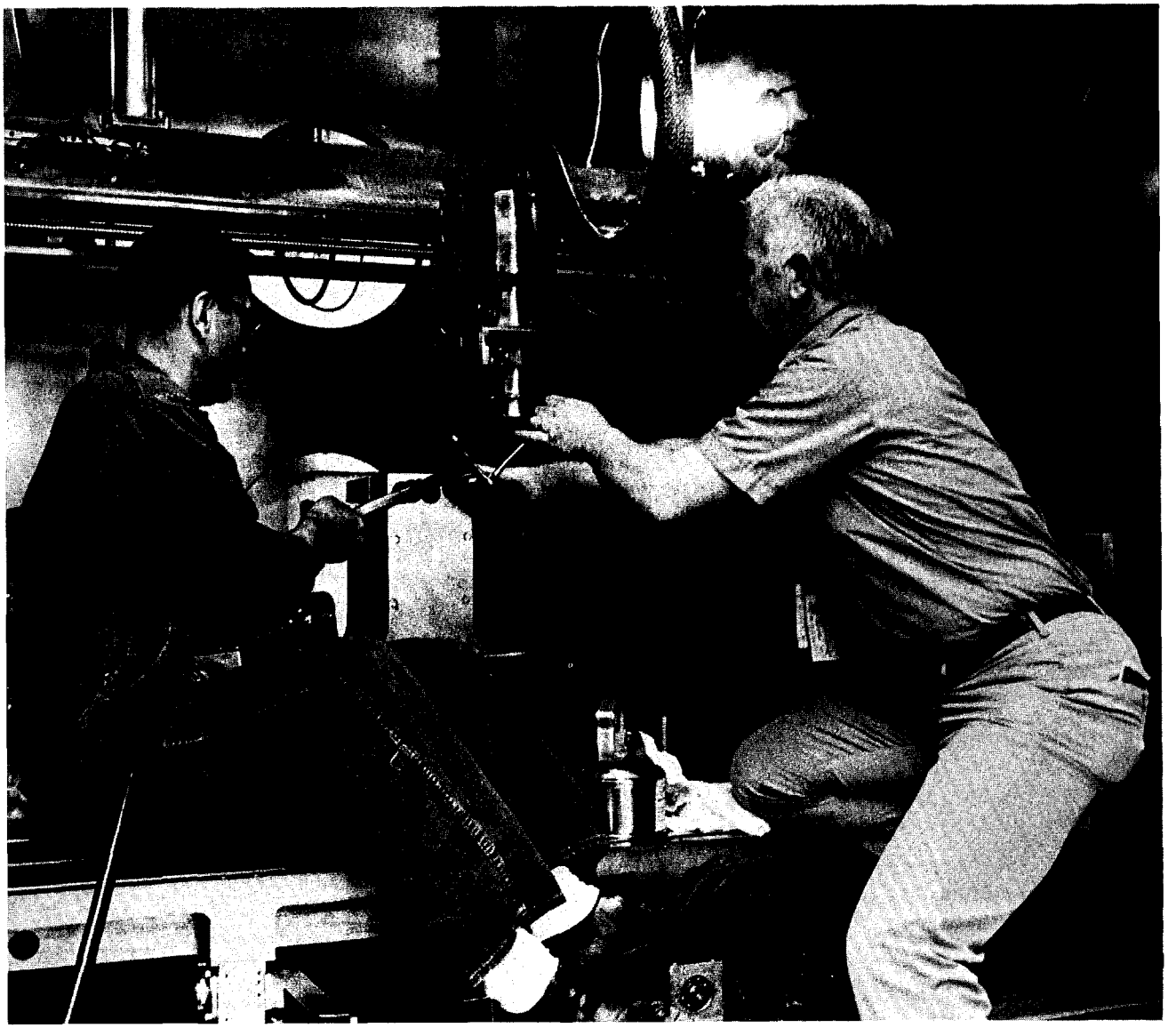


Fred Flick operates the manual control console for the CMB-6 Fabrication section's new electron beam welder. Note the complexity compared to the computer console behind Flick.



Victor Vigil and Ed Brundige prepare a mockup in the electron beam welder's vacuum chamber to determine some of the weld parameters for the P-16 mirror coil.

machine is longer than with the more conventional welding processes, but it will weld metals ten times faster and with much less distortion, so we can do closer tolerance work. The maximum welding speed of the electron beam welder is 100 inches a minute and it will weld through about six inches of aluminum or four inches of steel. With conventional processes we've laminated structures or have grooved and filled with filler wire to get these depths."

With conventional processes, the edges of parts to be welded are usually tapered so that when butted together the tapered edges form a V-shaped groove. The work is heated until it melts and flows together, and a metal rod or wire is then melted to fill the groove so that the weld extends through the entire thickness of the metal. In comparison, no grooving or filler rod or wire is required with electron beam welding and the welded joint appears as a narrow seam.

Other attractive advantages of electron beam welding are that weld strength is nearly equal to that of the base material since the material itself forms the joint, and the highly concentrated beam greatly reduces distortion normally associated with other joining processes.

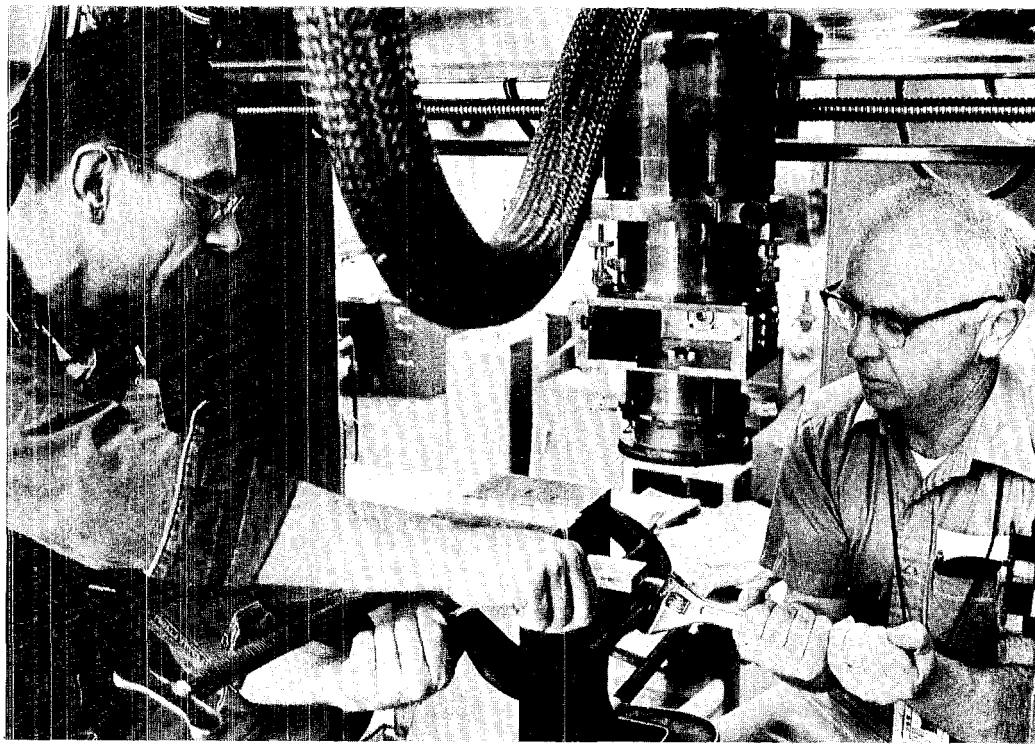
One of the first jobs done with

the new machine was for the Sherwood Program during the period of time when the electron beam welder was undergoing acceptance testing. Because computer debugging had not been completed, the job was produced using the manual control system. "It couldn't have been done with the conventional welding processes," said Ed Brundige, welding engineer. "It would have taken too much filler wire and the amount of heat we would have had to use would have changed the structure of the metal."

The job was a prototype version of a mirror coil for the Sherwood Program's linear Scyllac experiment which required a 2½-inch-deep weld to join two steel-alloy parts. The linear experiment is being conducted to investigate some of the problems associated with the development of fusion reactors capable of producing electric power. LASL scientists are attempting to compress and contain a superheated plasma in a magnetic bottle. In the linear device a very strong magnetic field will be used to pinch off or stopper the ends of the bottle against end losses. The mirror coil is the device in which this magnetic field is produced.

"We have to machine the coils in two halves to include a slot for insulation, but we want the coil in one homogenous piece so it will carry the electrical current efficiently and without arcing," said Ken Hanks of P-16. "We'll be operating with a magnetic field of about 250,000 gauss and will be putting magnetic pressure on the coil equal to about 37,000 pounds per square inch. Electron beam welding allows us to bring the parts back together without any interfacing and with minimum distortion."

The prototype mirror coil is currently being evaluated by P-16. Other tests are being conducted by the CMB-6 Fabrication section on mockups of coil assemblies to establish weld parameters in preparation for welding other similar prototypes and the mirror coil assembly that will be used on the five-meter linear Scyllac experiment.



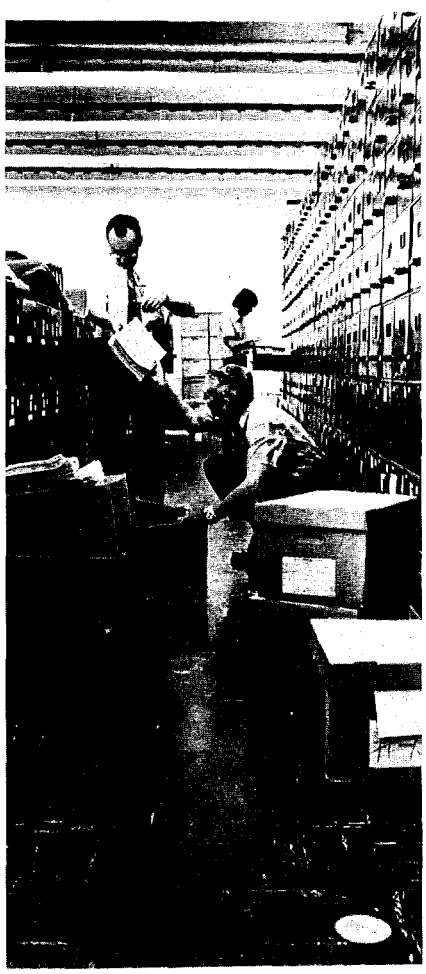
Vigil and Brundige clamp the mirror coil work between the two pieces of the coil jacket. At center is the electron beam gun.

The computerized machine is the CMB-6 Fabrication section's second electron beam welder. The first machine was installed about 1960. It has a vacuum chamber about one-third the size of the new one and produces a 15-kilowatt electron beam compared to the new machine's 30-kilowatt beam.

"The older machine,' Brundige said, "will weld through about two and a half inches of aluminum or one inch of steel. It's too small for some of the assemblies that are brought in here for welding. Jobs we do for the weapons program and others have been getting larger and more complex, and these are the reasons for the new machine."

LASL Employees Complete Spring Housecleaning

Gilbert Ortiz, ISD-5 alternate group leader and chairman of the clean-out campaign, talks with Laboratory personnel who spearheaded housecleaning operations in their respective divisions and departments.



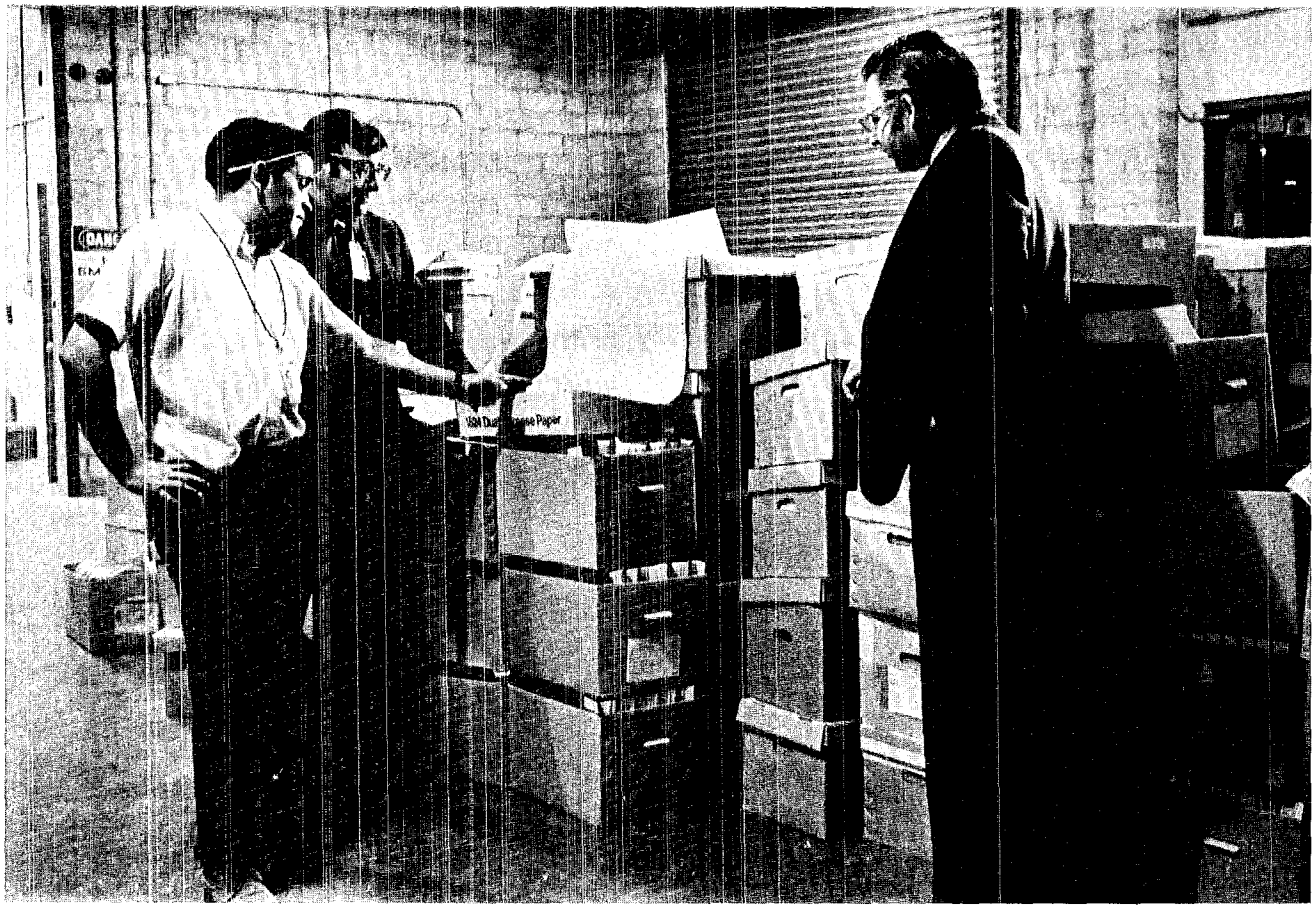
Cleaning out Director's office files in the ISD-5 vault are Dave Heimbach, group leader, Walt Bramlett, and John Archuleta.

Employees at the Los Alamos Scientific Laboratory have done their spring housecleaning.

In an effort to cut down on the amount of federal money spent on filing equipment and other office furniture, a Laboratory-wide campaign was conducted last month to clean out files and destroy all materials that are no longer useful.

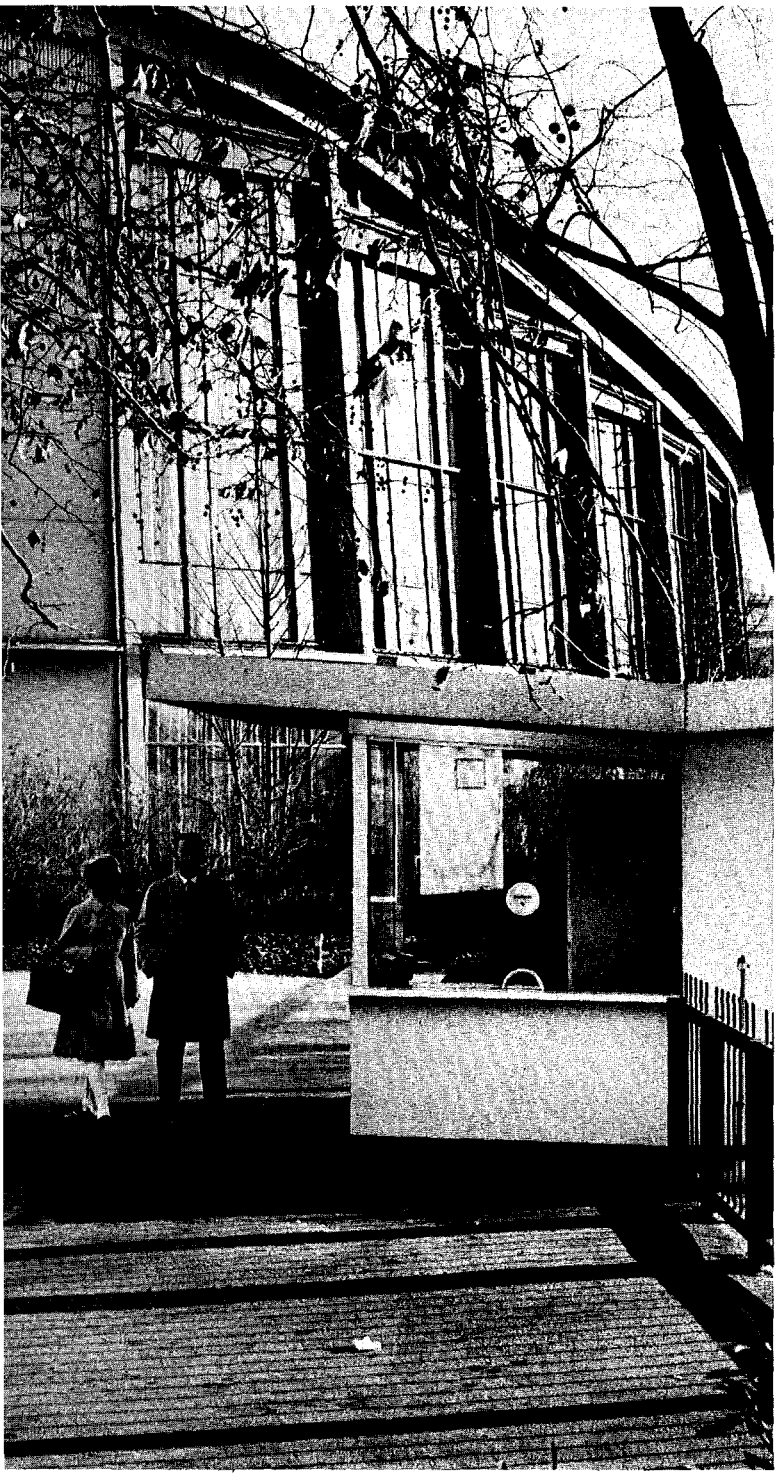
The campaign was a repeat of a clean-out campaign conducted in 1967 and was carried out under a directive from the Atomic Energy Commission. The goal is a 20 per cent reduction in records and reference materials.

According to Gilbert Ortiz, ISD-5 alternate group leader who chairmaned the campaign, the goal was expected to be reached in late March. "Records management is a continuing thing," Ortiz said. "Even though the Laboratory-wide campaign is over, we encourage personnel to be conscious of records and to continue discarding them after they have served their purpose."



Billy Trujillo, ISD-5, shows Ed Roybal, ISD-5, and Ortiz part of the 400 cubic feet of records at the LASL Records Management Center that were destroyed during the clean-out campaign.

Much of the reference material that Laboratory personnel cleaned out of their offices was sent back to the library. Here ISD-4 personnel screen some of the books and journals that were received. In foreground is Vera Martinez. In background are Betty Ekberg and Sylvia Rich.



Joe and Terry Leary walk near the Schwarzwald (Black Forest) Hall where concerts and exhibits are given routinely. (Photos by Dennig, Karlsruhe Research Center.)

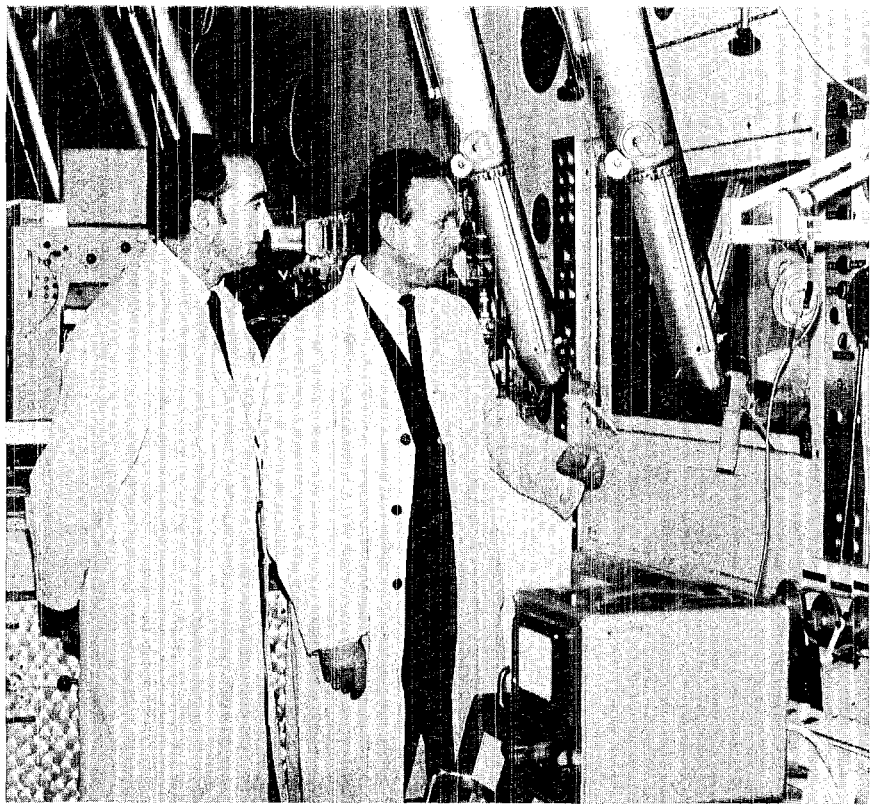
LASL's Man in Germany

For more than a year, Joe Leary, CMB-11 alternate group leader, has been the United States' representative at the Nuclear Research Center, Karlsruhe, Germany. He is serving a two-year appointment at the Center and upon completion will return to the Los Alamos Scientific Laboratory where he has been employed since 1944. At "The Atom's" request, Leary and his wife, Terry, have put down on paper some of their experiences and observations of life in Germany. Excerpts from their writings follow.

"The Center," Leary said, "is located seven miles north of Karlsruhe, a city of about 300,000 people, located in the geographic heart of Europe on the east bank of the Rhine River. The Center is operated for the German Ministry of Education and Science by the Nuclear Research Company which is headed by a board of directors. This board is composed of the leaders of the individual institutes which are analogous to LASL divisions. They elect one member to be the Center's director every two years. There are 3,500 employees in the Center, plus numerous industrial scientists. Institutes exist mainly for experimental physics, materials and solid state physics, neutron physics and reactor technology, reactor components, radiation chemistry, hot chemistry, applied nuclear physics, reactor development, reactor physics, nuclear engineering, and radiation biology. Other major organizations in the Center are Euratom's Transuranium Institute and several commercial nuclear fuel processing companies. Obviously, it's harder to describe than LASL.

"Like LASL, it is located in the midst of a rural forest land and it's a modern well-equipped facility. At the present time three nuclear reactors are in operation here, including one that generates 60 megawatts of electricity, part of which is used by the Center.

"Because there is no equivalent of the USAEC in Germany, some of the assigned projects are run by project offices, For example, there is a Fast Breeder Reactor Project Group and an Actinide Element Project Group. The latter is responsible for developing plutonium-238, californium and curium applications, including biomedical radioisotopic heat sources as at LASL.



Leary and a German scientist examine an irradiated fuel rod through a hot cell window at the Karlsruhe Research Center.

"It's difficult to describe an 'average day' as USAEC scientific representative to the Center. They vary considerably. We try to keep U.S. laboratories, working on nuclear power reactors, informed on what's occurring in 'Germany.' (The quotes are because the major German reactor project is a cooperative program with Belgium and the Netherlands to build a prototype fast breeder reactor). I also spend a large fraction of my time helping to keep the German project directors and individual laboratory scientists informed of what's going on in the U.S. laboratories, and to arrange interlaboratory visits where the need is indicated. I do not do any laboratory work myself, but serve as a consultant to project leaders and some of the working scientists, including those on the plutonium-238 biomedical radioisotopic heat source program. As it turns out, many aspects of my work here are similar to those at LASL before I left, except here the need for broadening the technical base is much more apparent. Working on a plutonium fuel material is not enough; the entire system has to be interrelated. Clearly this is not unique to Germany.

"Because of the international and industrial cooperative programs that the Center has, my job calls for some traveling to countries such as Belgium, Holland, France and Switzerland. It's very interesting to watch international cooperation at work and to compare it with interlaboratory and interagency cooperative efforts in the U.S.

"The Germans cannot comprehend what has happened in the U.S. regarding the recent layoffs of scientific and technically skilled workers. They believe it could never happen in Germany because the system here pretty well guarantees a trained person a 'lifetime' role in society. Almost all of the younger scientists would like to spend a year in the U.S. to improve their experience, but this is regarded in terms of a better future position in Germany.

"One of the most striking things here is the geographic nearness of everything compared to the U.S. Within a geographic area equal to one-third that of the U.S., eleven separate languages (who knows how many dialects?) and 15 different monetary currencies are required. Our German friends can't get over the size of the unknown state of New Mexico; it's as large as all of West Germany which has 60 million people and a gross national product that is nearly 20 per cent that of the entire U.S.

"There is a very strong desire for the advantages of international cooperation among the Germans, including cooperation with the United

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Terry Leary shops at an open-air market in Karlsruhe.

States. The English and, to a lesser extent, the French reflect this opinion. This is particularly strong in the area of nuclear development, which is expensive. New international cooperative agreements in nuclear energy are regular occurrences here.

"On the social side, dinners and concerts are relatively frequent occurrences. There are many German restaurants and a few Chinese, Italian and Balkan places. We do miss Spanish-Mexican food. Of course, the German wursts, bread, beer and white wines are excellent. We also exchange dinner parties with the German and other European families, and we participate in the formal Center functions such as the Christmas-New Year's party, the annual university ball and social functions given for U.S. visitors. It's basically the same life as at Los Alamos, but a very different mix in the types and backgrounds of people. Most of our personal friends here are German, although we also have some old acquaintances from Harwell, England, and some new friends from France and Holland.

"It's interesting to handle money here, because you need so many different types on a single trip. For example, if you drive to southern France, it's normal to use Deutsche marks, Swiss francs, Italian lire, plus French francs, all with very different exchange rates.

"Our apartment is located in a suburb called Neureut between Karlsruhe and the Research Center. The apartment is quite new, modern, and has some features we would like to import back to Los Alamos. Of course it has some disadvantages. Like all German homes, it is without window screens, which is unsatisfactory during summer in a farming community.

"Essentially all of our day-to-day communication, such as while shopping, is carried out in German. This is a little difficult, since this region of Germany features a very local accent. The German one learns in the U.S. is northern German, which is spoken here only by a small fraction of the people."

According to Mrs. Leary, "The welcome we received in Germany is unforgettable. The gentleman who met us at the Stuttgart Airport from the Kernforschungszenstrum (the Nuclear Research Center) had checked to be sure our apartment was ready and had informed our landlord that we would arrive about noon. After the very nice drive from the airport to Neureut, we were met at our apartment by our landlord, his wife and daughter. The German people use the word 'welcome' too, which was nice. The little girl, named Peggy (a very American name) had a bouquet of flowers for me. The apartment is in a building with three flights (three apartments), and ours is on the second floor. When we went up to our apartment there were flowers tied to the

doorknob and flowers in a vase on the divider in the living room. . . .

"About a month after we arrived it seemed to be autumn party time. The harvest and preparations for Christmas seem to provide excuses for many parties. We had no idea the German people were so merry. One usually thinks of them as being quite musical, but somber. They are gay in this area; they love to sing and dance and play games. The pleasure derived from simple things is a constant source of delight. We frequently wonder where and when it was that we forgot what pleasure it can be to just walk through the woods or take a bicycle trip. The people here, and we, do these things frequently.

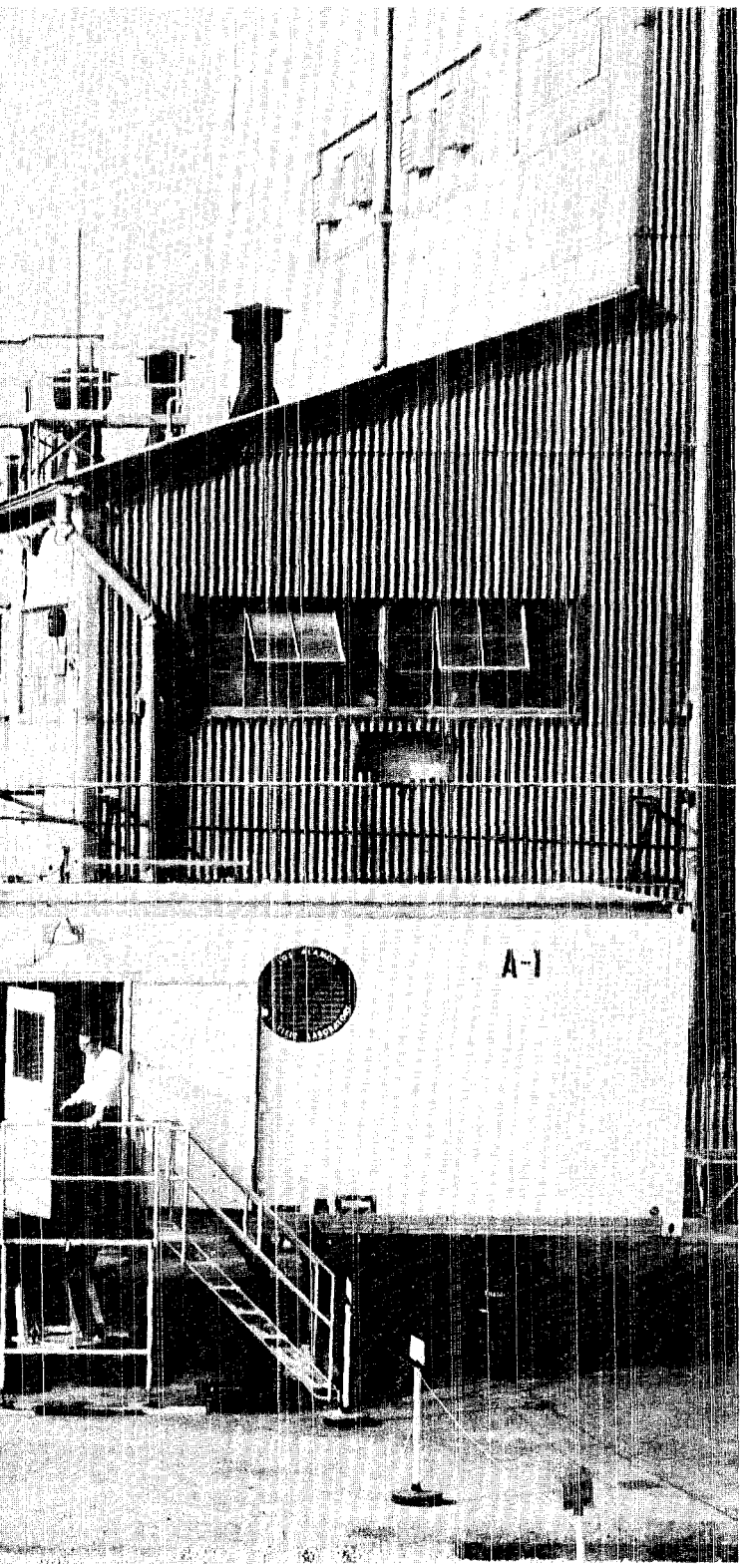
"Shopping for groceries seems to be a daily chore. The refrigerators are small, freezers very rare, and supplies in the stores in small towns, short. One learns that one must eat what is available at that time and not look for much variety. We do not find the canned or frozen things as tasty here, but probably it is our personal preference. In the summer time the fresh vegetables and fruits are wonderful. I believe because they are picked the morning before the sale. Our area is famous for the white asparagus, so we had six weeks of delicious white asparagus . . . hot, cold sauced or not . . . purchased just about an hour after it was picked! Shopping is a constant learning process. The butcher cuts things differently, but after a while one learns which cuts are best for which recipe. I borrowed a German meat chart and named my chart in a German manner. The weights in kilograms are different, but there is still the use of the 'pfund' which is roughly the same as our pound. U.S. beef seems to be our major claim to fame in the culinary department. No beef in Europe has quite the rich flavor. Tender, but not quite as tasty . . . but oh, the veal and pork! In Europe there is essentially no edible corn, and the potatoes are uninteresting.

"We have been in Germany for more than a year! It does not seem that long, yet looking back on what has happened it should be even longer."

Governor Bruce King signs the document proclaiming April 8 as Senator Clinton P. Anderson Day in New Mexico. Looking on are Gerold Tenney, LASL consultant and chairman of the executive planning committee for the event; State Representative Vernon Kerr, H-4, and State Senator John Rogers, P-8.

Two Years with

MONAL



Next month the Los Alamos Scientific Laboratory's Mobile Nondestructive Assay Laboratory will mark its second year of field deployment. First introduced to the nuclear industry at the Atomic Energy Commission Symposium on Safeguards Research and Development at Los Alamos in October of 1969, the mobile laboratory was deployed at its first field station—Dow Chemical's Rocky Flats Division near Boulder, Colo.—in May of 1970.

MONAL, as it is called by those who know it best, is a 10'x50' van containing the most advanced technology available for detecting, identifying and analyzing nuclear materials in unknown mixtures. This technology consists of direct physical methods for nondestructive, rapid and accurate assay of nuclear materials under a wide range of laboratory and field conditions.

Both portable and in-place instrumentation, developed by Group A-1 scientists, are contained in the van for "passive" and "active" assay of materials. Passive assay involves the use of detectors to obtain signatures characteristic of gamma rays and neutrons emitted by fissionable materials. In active interrogation, a neutron source is used to produce fissions in a material, and a detector records the resulting fission-produced neutrons and gamma rays. The signatures detected by either method are related to the type and quantity of nuclear material contained in scrap, wastes, residues and other mixtures.

MONAL grew out of the Nuclear Safeguards Program being conducted by Group A-1 to develop new and more effective techniques for national and international control of nuclear materials.

Many nuclear industrial concerns were interested in applying the new technology to a wide range of problems involving materials management, quality control and accountability. In response, the MONAL project was launched to demonstrate the applicability of the new nondestructive assay techniques, and to make as many people in nuclear industry as possible aware of them.

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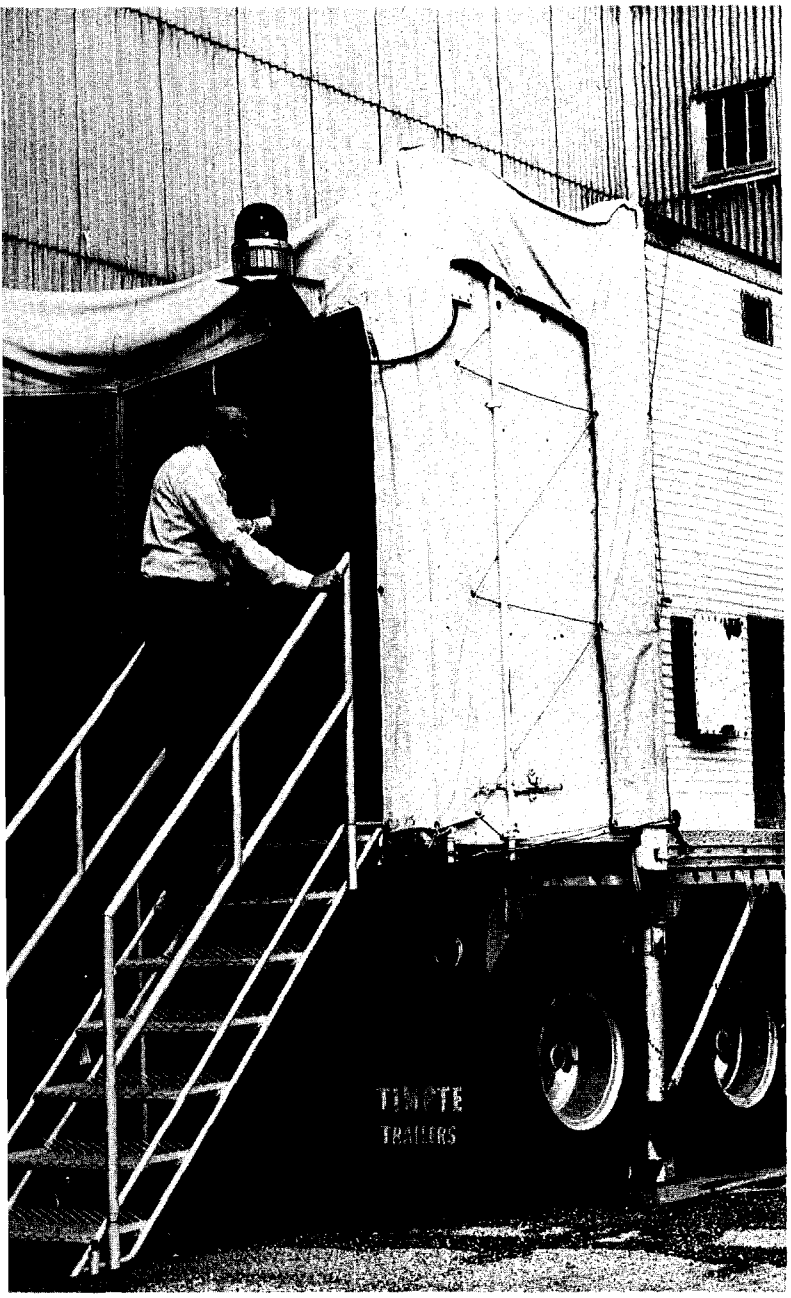
MONAL is shown in service at the National Lead Company of Ohio near Cincinnati. The carriers of the automated handling system can be seen on the underside of the van.



David Helfer enters the door of MONAL's equipment room, made larger by the addition of a collapsible room extension which folds up against the back of the van when it is in transit. (ORNL photo)

After nine months in construction, MONAL was exhibited at the AEC Symposium on Safeguards Research and Development. Then, after being tested under practical conditions at LASL's plutonium processing plant at DP site, the van made its inaugural journey to the Rocky Flats plant.

"At Rocky Flats, we assayed plutonium scrap and waste in one-gallon bottles and 55-gallon barrels and, for the purpose of comparison, we assayed their standards, treating them as unknown mixtures," said Joerg Menzel, who, along with T. Douglas Reilly, is responsible for MONAL operations. "Rocky Flats has a truely unique set of standards in a variety of matrix materials. These are barrels with known amounts of plutonium mixed in such things as graphite, resin, and wet and dry combustibles. Plutonium is an expensive material and a lot of it is used simply in maintaining these standards. In addition, if plutonium is mistakenly believed to be in a certain matrix whereas it is actually in another, the assay instruments in use at the plant can be fooled because the calibration employed for one matrix material is different than that used for another.

"We set out to demonstrate that our more sophisticated assay techniques can be used to accurately assay plutonium in sealed containers regardless of the matrix material, thereby drastically reducing or eliminating the need for standards in each matrix category. At the present time it's not clear whether our more sophisticated techniques can be effectively employed within the constraints of a production line such as they have at Rocky Flats. What it comes down to is complexity of standards versus complexity of instrumentation.

"We stayed at Rocky Flats until July 7 and then came back to Los Alamos to make some modifications that we felt were desirable based on our initial experience. We learned that the van's weight per axle was such that we would have trouble getting a highway permit in some states. We had a third axle added in Denver, and at LASL a collapsible extension was added to the equipment room at the rear of the trailer to give us five more feet to service the accelerator."

The room extension's walls, floor and ceiling consist of hinged metal flaps which fold up against the back of the trailer while in transit, similar to the manner in which the four flaps are closed on a cardboard packing box. The end wall of the extension is an aluminum square with

access door which is placed against the four extended hinged flaps.

In addition, the mobile laboratory's large handling system was modified to accomodate a greater variety of 55-gallon drum configurations. This system is an automated monorail conveyor with 16 sample-carriers and an elevator mounted on the underside of the van. Containers of fissionable materials ranging in size up to 55-gallon barrels are placed on the carriers. From the control room, one carrier at a time is properly positioned beneath the van's shielded cavity section. Through an opening in the floor, an elevator raises the container into the cavity where it is actively interrogated. The elevator then lowers the container back onto its carrier and the cycle is repeated until all the containers placed on the carriers have been interrogated.

"We also obtained an auxiliary trailer to go with MONAL on its field assignments," said Menzel. "It carries oil for cavity shielding, handling system carriers and other shielding equipment. The auxiliary trailer cuts down on our setup time. Before, we had to ship some items or carry them in the van. Now we take them along in the auxiliary trailer."

In November, MONAL was deployed at the National Lead Company of Ohio's Feed Materials Production Center in Cincinnati where its instrumentation was used to assay low enriched uranium scrap in the form of fuel rods, pellets and incinerator ash.

"NLO recovers uranium from scrap, received from all over the nation, to provide the feed material for the production reactors at Savannah River and Hanford which make plutonium," Menzel said. "The plant is geared to process scrap containing less than 10 per cent enriched uranium-235, although there have been cases where they have received material whose enrichment was greater. For this reason, they were interested in finding a rapid, inexpensive, nondestructive method of measuring the enrichment of uranium in incoming material. Reilly, Roddy Walton and Jack Parker devised what we call the 'enrichment meter,' a passive and portable instrument that can measure enrichment in a wide variety of product and scrap materials such as powders, rods and pellets. An outgrowth of the enrichment meter is an instrument that is now commercially available.

"Another thing we did at NLO was to demonstrate, for the first time in a field situation, the ability of active assay techniques to measure both grams of uranium and enrichment."

Helfer makes preparations for assaying a container of material at the Oak Ridge Gaseous Diffusion Plant. (ORNL photo)

In March of 1971, the mobile laboratory moved on to Leechburg, Pa., to measure a substantial portion of the scrap inventory of highly enriched uranium for the Nuclear Materials and Equipment Corporation.

"At NUMEC we tested several of our nondestructive assay techniques and compared them to each other, and we inventoried a significant fraction of the corporation's in-storage scrap materials," said Menzel. "They had containers where uranium of varying enrichments was distributed in non-uniform layers within the matrix materials. It was a new and challenging problem. As a solution, we developed a sophisticated passive-assay system based on the use of proper transmission sources and a collimated germanium detector. With this system, 'segmented gamma scan,' a container is assayed in individual segments or slices, and it provides accurate assay information for such difficult cases. At present there are several companies interested in the commercial production of instruments based on the segmented gamma scan system and we are working closely with them."

In late June, MONAL was sent to West Palm

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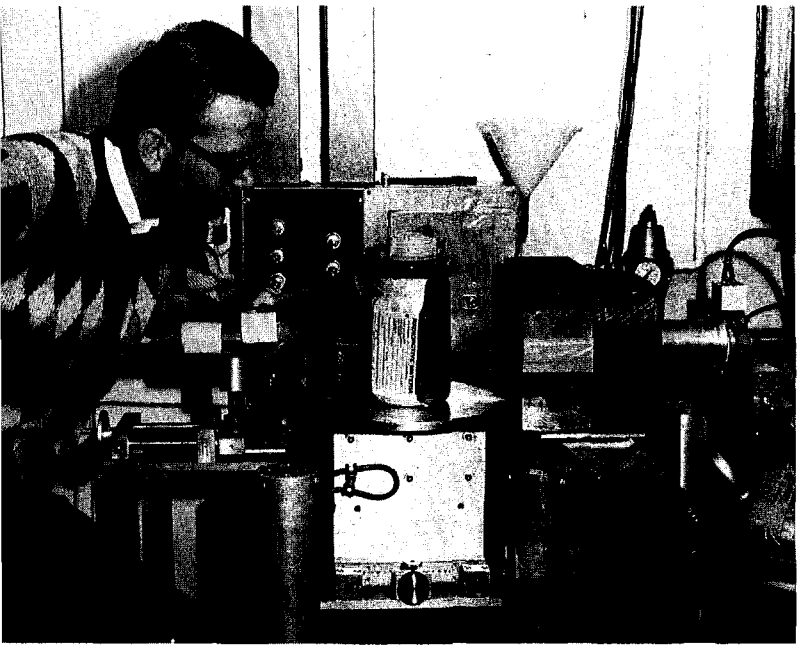

Joerg Menzel demonstrates use of the segmented gamma scan system. (ORNL Photo)

Beach, Fla., where it was exhibited at the 12th Annual Meeting of the Institute of Nuclear Materials Management. In conjunction with the meeting, the paper, "Field Assay Experience with the MONAL at National Lead Company of Ohio," was presented by Menzel. A complementary paper was presented by Parker on passive assay techniques, most of which were tested in the mobile laboratory.

Following the Florida engagement, the mobile laboratory returned to Los Alamos for refurbishing. Based on their previous field experience, Group A-1 members felt it would be desirable to provide better accomodations for passive assay instrumentation and associated electronics. At this point, passive assay instrumentation was located in a corridor in the van. Electronics were shared with active interrogation equipment and could not be operated simultaneously. "Originally," Menzel said, "we had a sample preparation room built into the van for the preparation and storage of samples. But it had low utilization, so we made it into a passive assay laboratory complete with detectors, independent electronics, interfaced programmable calculator and sample-handling equipment for up to five-gallon containers."

Before leaving on its next assignment, the MONAL crew assayed some material at LASL including rags and gloves in 55-gallon barrels. Then, in October, the van was taken to the Oak Ridge Gaseous Diffusion Plant. "We've evaluated uranium content in 250 hexafluoride cylinders," Menzel noted. "The Oak Ridge people wanted to discard these cylinders, but their contents had to be measured to be sure they could be disposed of safely, and they had no way of doing it. We also measured uranium hexafluoride concentrations in various scrap materials contained in barrels and cans. In addition, we measured hexafluoride concentrations in the operating gas diffusion plant as well as in a shutdown portion, and we demonstrated methods of measuring uranium in liquid wastes. MONAL is still at Oak Ridge and will be until later this month."

Because of the length of time spent at each installation, the MONAL crew rotates every two weeks. The primary crew consists of Menzel and Reilly, and technicians David Helfer and Tom VanLyssel, although almost all Group A-1 members participate in MONAL operations on a rotating basis.

"We look at MONAL as a success in various respects," Menzel said. "First of all, we see the need for our instruments and techniques, although sometimes we feel like social workers because for a plant they mean a change in methods that have been used for many years. It's difficult making people aware of the power of the new techniques, but I think we've made a significant contribution, particularly judging by the number and interest of representatives of the nuclear industry and instrument manufacturers visiting our group almost continually. Secondly, we are able to test our instruments and techniques on a wide range of problems, some we've never seen at LASL. Another plus side is that it's a tremendous educational opportunity for us. We're in a new field and are mostly young scientists. MONAL provides us with a look at almost all of the various facets of the nuclear industry."

the technical side

Taken from LASL Technical Information Reports submitted through ISD-6

Workshop on the In Vivo Measurement of Heavy Elements, Lawrence Livermore Laboratory, Calif., Nov. 8-9:

"Summary of Session on Instrumentation Techniques" by P. N. Dean, H-4 (invited)

Colloquium, Lawrence Livermore Laboratory, Calif., Jan. 20:

"Fast-Nucleon Capture" by D. M. Drake, P-DOR (invited)

Fusion First-Wall Materials Meeting, Atomic Energy Commission-Germantown, Md., Jan. 27-28:

"First-Wall Materials Problems in a Pulsed Fusion Reactor" by F. L. Ribe, P-15, and W. V. Green, CMB-13

"Tritium Effects and Some Possible Fatigue Effects in Pulsed Reactors" by W. V. Green, CMB-13

American Physical Society Meeting, San Francisco, Jan. 31-Feb. 3

"Deuteron (Proton, Deuteron) Hydrogen Tensor Polarization Transfer" by C. K. Mitchell and G. G. Ohlsen, both P-DOR

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short subjects

Approximately 800 students from the five-state area of New Mexico, Texas, Colorado, Arizona and California are expected to attend Science Youth Days at the Los Alamos Scientific Laboratory April 12-14.

Los Alamos High School science seniors will tour LASL facilities April 12. A selected number of these will assist the Laboratory's Public Relations group, ISD-2, the following two days as honorary guides.

Ken Hill, ISD-2, is chairman of this year's event. This will be the 15th time in 16 years that Science Youth Days have been held at LASL. Similar events are held at various locations throughout the country in observance of the birthday of Thomas A. Edison. Although Edison was born in February, weather conditions in the mountainous area of Los Alamos forced a change in dates to April.

Louise Vigil, GMX-7, and her daughter, Sophie Ann, were killed in an automobile accident March 4. They are survived by the husband and father, Jose D. Vigil.

Jean McClelland, a member of Group H-5 since 1950, has retired. She will continue to live in Los Alamos.

Charles Metz, CMB-1 group leader, who was recruited in 1944 to play a role in the vital mission of the Manhattan Engineer District at Los Alamos, will retire April 14.

Metz served at the Laboratory until the end of World War II. He then returned to Colorado State University to complete his obligation as a professor of chemistry. He returned to Los Alamos in 1946 and joined Group CMR-1 which later became CMB-1. He was promoted to group leader in 1952.

Metz received the B.S. degree in chemistry from the South Dakota School of Mines and Technology at Rapid City. He received the M.S. degree in chemistry and the Ph.D. degree in physical chemistry from the University of Colorado, Boulder.

He has served as a member of the Atomic Energy Commission's Advisory Committee for Standard Reference Materials and Methods of Measurements and is a Fellow of the American Institute of Chemists. He was awarded the honorary degree of Doctor of Science by his alma mater, the South Dakota School of Mines and Technology, ". . . for his outstanding professional attainments; for his many contributions in the field of analytical chemistry; for his success as a teacher and as a leader of men."

The chemist and his wife, Virginia, will continue to live in Santa Fe. He will serve as a consultant at the Laboratory.

"Calibration of the Helium-3 (Deuteron, Proton) Helium-4 Analyzing Power at Low Energies" by G. G. Ohlsen and C. K. Mitchell, both P-DOR

"The ^{4}He(p, p) ^{4}He Reaction" by D. D. Armstrong, P-12, P. W. Keaton, Jr., P-DOR, Y. K. Lee, Johns Hopkins University, Baltimore, Md., and P. M. Kurjan, Stanford University, Calif.

"Observation of Different Regimes in Superfluid Helium Film Flow and the Saturation of Fluctuation Dissipation" by L. J. Campbell and D. H. Liebenberg, both P-8

"Further Investigations on the Flowing Superfluid Film" by L. J. Campbell, J. C. Fraser, E. F. Hammel, J. K. Hoffer, W. E. Keller and R. H. Sherman, all P-8

"Dissipation in Saturated Superfluid Film Flow" by L. J. Campbell, J. C. Fraser, E. F. Hammel, J. K. Hoffer, W. E. Keller and R. H. Sherman, all P-8

"Study of KR-86 with RB-87(T,A) Reaction" by A. B. Tucker, San Jose State College, Calif., J. D. Knight, C. J. Orth and K. E. Apt, all CNC-11

"Analyzing Power of the Reaction Triton (Proton, Neutron) Helium-3 at 45° C.M. from 1.5 to 12 Million-Electron-Volts" by J. J. Jarmer, R. C. Haight, J. E. Simmons, J. C. Martin, all P-DOR, and T. R. Donoghue, P-DOR visiting staff member

"A Possible Anomalous Interaction in Muon-Proton Scattering at Low Energies" by H. W. Fearing, T-5

"Recent Experimental Results for (Pi-Plus, Two-P) and (Pi-Plus, P) Reactions on Light Nuclei" by R. J. Macek, MP-7 (invited)

"Momentum Dependence of Screening in N-d Total Cross Sections" by R. E. Mischke, MP-4, T. J. Devlin and R. Ehrlich, both Rutgers University, New Brunswick, N.J.

"Nuclear Spin Relaxation in Liquid Arsine" by L. J. Burnett and A. H. Zeltmann, both CNC-2

"El Transition Probabilities between the Nilsson States ½+ [411] and ½- [541]" by K. E. G. Lobner, Technical University, Munich, Germany, and M. J. Bennett and M. E. Bunker, both P-2

"X-Ray Fluorescence and Several Specific Biological Applications" by C. J. Umbarger and J. J. Malanify, both A-1

"Kinetic Energy Distributions in the Spontaneous Fission of ^{250}Cm and ^{250}Cf" by Darleane C. Hoffman, G. P. Ford and J. P. Balagna, all CNC-11

"Anomalous Absorption of Electromagnetic Waves Near the Electron Plasma Frequency of Laboratory Plasma" by J. C. Ingraham, P-13 (invited)

"Energy and the Future of Nuclear Fusion" by J. L. Tuck, P-DO

"Time-Reversal Invariance in the Triton (Proton, Deuteron) Deuteron and Deuteron (Deuteron, Proton) Triton Reactions" by N. Jarmie, P-DOR, and J. H. Jett, A-2

"Analysis of Fission Isomer Excitation Functions" by H. C. Britt, P-DOR, and M. Bolsterli and J. R. Nix, both T-9

"Condensed Explosives Laser" by C. P. Robinson and J. A. Sullivan, both L-3

"The Vector Analyzing Power of the Single Particle States in the ^{208}Pb(d, p)^{209}Pb Reaction" by E. R. Flynn, P-12, R. F. Casten, Brookhaven National Laboratory, Upton, N.Y., O. Hansen, P. W. Keaton, Jr., both P-DOR, E. R. Cosman, Massachusetts Institute of Technology, Cambridge, Mass., N. Stein, Yale University, New Haven, Conn., and R. Stock, Max-Planck Institute, Heidelberg, Germany

"Weak Pair Correlations in Excited Zero-Plus States of Actinide Nuclei" by O. Hansen, J. D. Garrett, both P-DOR, R. F. Casten, Brookhaven National Laboratory, Upton, N.Y., and E. R. Flynn, P-12

"Photoabsorption Cross Section of H_2, D_2, N_2, O_2, Ar, Kr, Xe for Gas Densitometry" by L. E. Porter, University of Montana, Missoula, J. E. Brolley, P-DOR, J. C. Fong, University of California at Los Angeles, R. H. Sherman, P-8, and J. K. Theobald, J-10

Seminar, University of New Mexico, Albuquerque, Feb. 1:

"Value Systems Relating Technology to the Quality of Life" by H. J. Otway, J-DO

Nineteenth Refractory Composites Working Group Meeting, National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, Feb. 1-2:

"Carbon and Graphite Research and Development at LASL" by M. C. Smith, CMB-13

"Improved Thermal Shock Resistant Carbides" by R. E. Riley and J. M. Taub, both CMB-6

Super-HILAC Users Group Symposium, San Francisco, Calif., Feb. 3:

"Plans for Heavy Ion Fusion Experiments on the Berkeley Super-HILAC" by H. C. Britt, P-DOR (invited)

Albuquerque Chapter, American Welding Society Meeting, Feb. 3:

"Flash X-Ray During Electron Beam Welding" by L. E. Bryant, GMX-1

Seminar, Lawrence Livermore Laboratory, Calif., Feb. 4:

"Spin Structure of the Triton (Proton, Neutron) Helium-3 Reaction" by R. C. Haight, P-DOR (invited)

Physics Department, Idaho State University, Pocatello, Feb. 4:

"Chemical Information from Pulse NMR" by L. J. Burnett, CNC-2 (invited)

Lecture Series, von Karman Institute for Fluid Dynamics, Brussels, Belgium, Feb. 7-11:

"Numerical Methods in Fluid Dynamics" by T. D. Butler, T-3

Rocky Mountain Chapter, Society of Nuclear Medicine and University of New Mexico School of Medicine, Albuquerque, Feb. 10:

"Radionuclide Production and Separation" by H. A. O'Brien, Jr., CNC-11

Annual Winter Meeting, Greater

Rio Grande Chapter, American Society for Computing Machinery, El Paso, Texas, Feb. 11:

"CROS, LASL's CDC 7600 Operating System--An Extendible Monitor" by A. W. Walker, C-2

"GIRLS" by W. Draisin, C-4

New Mexico Chapter, American Society of Civil Engineers Meeting, Albuquerque, Feb. 11:

"Transporting Material with Air Float Systems" by M. D. Keller, ENG-1

"Brackish Water: A Valuable Resource" by L. P. Reinig, ENG-DO

"Fluid Dynamics of Wind Action on a Small Basin" by W. S. Gregory, ENG-7

Seminar, Department of Biophysics, Northern Michigan University, Marquette, Feb. 15:

"A Classical and a Modern Approach to Chromosome Structure Analysis" by L. L. Deaven, H-4 (invited)

U.S. Army National Security Management Course, Santa Fe, Feb. 15:

"Natural Energy Resources of New Mexico" by W. D. Purtymun, H-8, and D. W. Brown, N-7 (invited)

Colloquium, University of Denver, Colo., Feb. 16:

"Superfluids--Summary and Recent Observations" by D. H. Liebenberg, P-8

Ames Research Center, Moffett Field, Calif., Feb. 16, and Lawrence Livermore Laboratory, Calif., Feb. 17:

"The Stabilized Z-Pinch Program at Los Alamos" by J. A. Phillips, P-14

Seminar, Department of Physics, Arizona State University, Tempe, Feb. 17:

"Gross Features of Pion-Nucleus Scattering" by R. R. Silbar, T-5

Seminar, Department of Biophysics, Northern Michigan University, Marquette, Feb. 17:

"The Paradox of DNA Constancy in Heteroploidy" by L. L. Deaven, H-4 (invited)

Bell Telephone Laboratories, Murray Hill, N. J., Feb. 17; University of Michigan, Ann Arbor, Feb. 21; Wesleyan University, Middletown, Conn., Feb. 23; University of Connecticut, Storrs, Feb. 24; and Dartmouth College, Hanover, N.H., Feb. 25:

"Superfluidity in Helium Films" by J. C. Fraser, P-8 (invited)

American College of Radiology-NASA Joint Meeting on Technology Transfer, Albuquerque, Feb. 20:

"Technology Transfer from LAMPF" by L. Rosen, MP-DO (invited)

American Institute of Mining, Metallurgy and Petroleum Engineers 101st Annual Meeting, San Francisco, Calif., Feb. 20-24:

"Liquid-Liquid Phase Transformations in Tin-Mercury Alloys from EMF Studies" by C. S. Weaver, D. J. Jerome, R. C. Whitelatch, all University of Utah, Salt Lake City, and G. R. B. Elliott, CNC-2

Chemical Kinetics Class, University of New Mexico, Albuquerque, Feb. 21:

"Molecular Beam Kinetics" by J. B. Cross, CNC-4

Physics Department, University of Texas, Dallas, Feb. 22:

"Magnetotail Plasma and Magnetospheric Substorms" by E. W. Hones, Jr., P-4 (invited)

Annual Symposium on Applied Vacuum Science and Technology, American Vacuum Society, Florida Chapter, Clearwater, Feb. 24-25:

"Surfaces of As (0001)" by W. P. Ellis, CMB-8, and J. W. Tester and C. C. Herrick, both CMB-13

University of California, College of Biological and Agricultural Sciences, Riverside, Feb. 24-25:

"The ICONS Program at LASL" by N. A. Matwiyoff, CNC-4

Annual Meeting, Biophysical Society, Toronto, Ontario, Canada, Feb. 24-27:

"Cell Analysis and Sorting by High-Speed Flow Methods" by M. A. Van Dilla, H-4 (invited)

"DNA-Membrane Associations in Cultured Chinese Hamster Cells" by C. E. Hildebrand and R. A. Tobey, both H-4

"In Vitro Studies on the Synthesis of Ribonucleic Acid Using Ionizing Irradiated RNA Polymerase" by G. F. Strniste, A. M. Martinez and D. A. Smith, all H-4

"Instrumental Factors Influencing Resolution in Flow Microfluorometry" by D. M. Holm, L. S. Cram, both H-4, and R. D. Hiebert, P-1

"Flow Microfluorometry for Fluorescent Antibody-Antigen Studies" by L. S. Cram and J. C. Hensley, both H-4

"Do Internal Details of Mammalian Cells Influence Their Light Scattering Patterns?" by A. Brunsting, and P. F Mullaney, both H-4

"A New Multisensor Cell Analysis and Sorting System" by J. A. Steinkamp, H-4, M. J. Fulwyler, formerly H-4, and J. R. Coulter, SD-5

Nuclear Engineering Department, Texas A&M University, College Station, Feb. 25:

"A Gamma Ray Spectrometer for the Study of Radiative Neutron Interactions" by E. J. Dowdy and M. E. Ennis, both P-3, and C. H. Reed, N-2

Upjohn Company, Kalamazoo, Mich., Feb. 25:

"Differential Effects of Cytosine Arabinoside and Sodium Camptothecin on Initiation of DNA Synthesis" by R. A. Tobey, H-4 (invited)

Michigan State University/Atomic Energy Commission Plant Research Laboratory, East Lansing, Feb. 28-29:

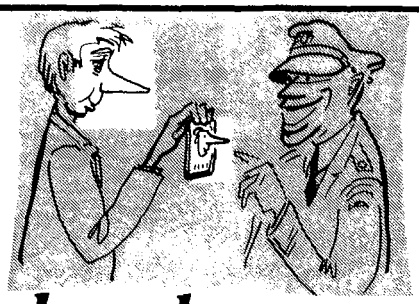
"Biochemical Properties of Chinese Hamster Cells Reversibly Arrested in G_1 in Isoleucine-Deficient Medium" by R. A. Tobey, H-4 (invited)

"Determination of the Effects of Chemotherapeutic Agents on Mammalian Cell Traverse" by R. A. Tobey, H-4 (invited)

Colloquium, University of Wyoming, Laramie, Feb. 29:

"A Preview of the Los Alamos Meson Physics Facility" by L. E. Agnew, MP-7

20 years ago in los alamos



Culled from the April, 1952, files of the Santa Fe New Mexican by Robert Porton

Santa Fe-Los Alamos Road Announced

The Office of the U.S. Bureau of Public Roads in Santa Fe announced two four-lane projects on the road between Santa Fe and Los Alamos. A 2.3 mile job estimated to cost $440,000, is planned between Totavi and White Rock junction. Later the bureau will call for bids for paving a four-lane route from Totavi to the Espanola junction. The federal government will bear the entire expense.

Hill Records Judged Valuable

Vienna-born composer Ernst Krenek dropped by Mesa Library during a visit to Los Alamos. He looked over the circulating record collection, and termed it "valuable." Currently working on a new opera described as "another form of top secret," Krenek, recognized as one of the leading composers of Europe, is well acquainted with the record business. Many of his compositions have been cut on disks. He praised the library for its outstanding program.

New Badge Pictures Scheduled

For some Hillsters who feel their pass and badge picture "don't do them justice" there is good news today. The first phase of the changeover for all Los Alamos pass and badge holders has been announced. The new pictures are to be taken of all persons who have not been photographed for identification purposes since August, 1951. "Smile, darn you, smile" will be the watchword.

Troops Observe Bomb Blast

Los Alamos scientists unleashed another atomic explosion in the United States directly over 1,500 troops who reported "all safe" from their foxholes 20 minutes after the blast showered them with dust and pebbles. The device was dropped from a B-50 plane flying at 33,000 feet over the Nevada Test Site. Four micro-wave relay stations atop mountains between the site and Los Angeles, 300 miles away, carried the historic pictures into the homes of thousands of television viewers. A nation-wide TV audience was able to witness the explosion as though it stood alongside newsmen and officials at News Knob, only 10 miles from the blast site.

what's doing

PUBLIC SWIMMING: High School Pool—Monday through Wednesday, 7:30 to 9 p.m.; Saturday and Sunday, 2 to 5 p.m.; Adult Swim Club, Sunday 7 to 9 p.m.

SIERRA CLUB: Luncheon meeting at noon, first Tuesday of each month, South Mesa Cafeteria. For information, call Brant Calkin, 455-2468, Santa Fe.

RIO GRANDE RIVER RUNNERS: Meetings scheduled for noon, second Friday of each month at South Mesa Cafeteria. For information, call Joan Chellis, 662-3836.

LOS ALAMOS SAILORS: Meetings at noon, South Mesa Cafeteria, first Friday of each month. For information, call Dick Young, 662-3751.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leaders for information.

April 15—Ashley Pond Boat Show

April 16—Lyden to San Juan Training Cruise, Cecil Carnes, 672-3593

April 22-23—Chama Canyon river trip, Jon Cross, 662-7521 and Les Redman, 455-2943

April 27—Noon meeting, South Mesa Cafeteria, Reed Elliott, 662-4515

April 29—Bandelier Wilderness, Dorothy Hoard, 672-3356

April 29—Gate hanging and slalom practice, Harriet Martin, 662-6451

April 30—Otowi Bridge Slalom Race, Harriet Martin, 662-6451

SPORTS CAR CLUB DEL VALLE RIO GRANDE: Meetings 7:30 p.m., Hospitality room, Los Alamos National Bank, first Tuesday of each month. For information, call Gerry Strickfadden, 672-3664, or Frank Clinard, 662-4951.

MOUNTAIN MIXERS SQUARE DANCING CLUB: Mesa School, 8 p.m. For information, call Florence Denbow, 662-5014.

April 1—Gregg Anderson, Colorado Springs, Colo.

April 15—Bones Craig, club caller

NEWCOMERS CLUB: April 26, 8 p.m., couples' wine tasting party, 120 Dos Brazos. For information, call Bobbie Madsen, 662-7400.

MESA PUBLIC LIBRARY:

April 12-28—National Library Week

April 3-25—Lillian Seamons, watercolors

USAF Major General Edward Giller, center, assistant general manager of the Atomic Energy Commission's Division of Military Application, talks with LASL's Bob Shreffler, W-division leader, and Henry Motz, P-division leader, during his recent visit to the Laboratory.

Henry T. Motz
3187 Woodland
Los Alamos, New Mexico 87544

The last of 352 tank sections which make up the Los Alamos Meson Physics Facility's side-coupled-cavity accelerator is emplaced by Group MP-3 members Jerry Sherwood, Ed Weiler and Gus Roybal.